

The Future of NALMEB

The NALMEB Prepositioning Study Final Report

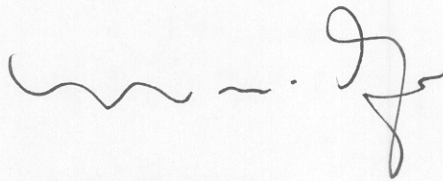
Kim Deal • Stephen Guerra • Annemarie Randazzo



4825 Mark Center Drive • Alexandria, Virginia 22311-1850

Approved for distribution:

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A handwritten signature in black ink, consisting of a series of loops and a final flourish.

Mark B. Geis, Director
Naval Operations and Support Team
Integrated Systems and Operations Division

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Summary

We were asked by the Deputy Commandant (DC), Plans, Policies and Operations (PP&O), Headquarters Marine Corps (HQMC), to analyze the Norway Air-Landed Marine Expeditionary Brigade (NALMEB) program. The study objective was to analyze the NALMEB program considering the current strategic environment. Specifically, we considered the political implications of program change, potential missions, and implementation issues. In this final report, we summarize our findings, offer considerations for implementation, and provide recommendations.

The NALMEB was established in 1981 with a bilateral memorandum of understanding (MOU), which indicates that the U.S. will provide a Marine Expeditionary Brigade (MEB) for the defense and reinforcement of Norway. At the start of our study, the program was beginning to shift toward operations outside of Norway but NALMEB was still tailored toward the defense of Norway.

Our analysis of the MOU, combined with stakeholder interviews and case studies, suggests that there is bilateral support for changing the language describing the mission and equipment mix. Other options explored—such as co-deployment of Norwegian and U.S. forces, and termination of the NALMEB program—are not politically feasible, because of obstacles from both the U.S. and Norwegian perspectives.

These findings became the starting point for deriving new missions for NALMEB. We derived future mission traits to develop a framework for identifying appropriate missions. The framework and underlying assumptions suggest that NALMEB is most appropriate for low- and mid-intensity missions such as humanitarian assistance, disaster relief, and peace operations. We used these missions to identify potential changes in equipment mix in the prepositioning objective.

Depending on the capability set desired, the equipment mix changes can become expensive. The Marine Corps is currently spending about \$123 million to modernize NALMEB prepositioned equipment between FY00 and FY08. To increase the humanitarian assistance capability, an additional \$11 million to \$39 million is required above the modernization cost. To add a modest combat capability, another \$10 million is needed; this increases to about \$150 million if the AAV is desired.

We considered whether NALMEB can be augmented with other Marine or NATO forces in order to expand its capabilities at a lower cost. We found that the integration of a deployed MEU (SOC) with a NALMEB-sourced Marine Air Ground Task Force (MAGTF) satisfies the combat deficiencies in NALMEB. Integration of an MPF-sourced MEB with a NALMEB-sourced MAGTF satisfies most of the motor transport, engineering, and combat deficiencies. This is a particularly attractive approach, offering the Marine Corps an opportunity to increase its global forward presence and responsiveness within the planned capabilities.

As an example of integration with a coalition force, we considered the Norwegian rapid-reaction FIST-H program. The FIST-H program is a near-perfect complement to the NALMEB program, providing heavier combat and engineering capabilities.

The NALMEB program was designed to support a Cold War mission. As the focus of the program changes to operations outside of Norway, many changes will be needed in its policy, management, processes, procedures, and command relationships. We explored several implementation issues, such as the process for updating the MOU and prepositioning objective, and policy clarification.

Changing the language of the MOU is a multi-step process. First, the Marine Corps must reach consensus on the language describing the new mission and equipment. Second, it must present the proposed language to the Office of the Secretary of Defense (OSD) and informally introduce it to the Norwegians at the action officer level. Once the action officer levels of OSD and Norway have reached consensus, the draft language will be shown to the State Department and the

General Counsel for concurrence. The draft MOU will then be formally presented to Norway's Ministry of Defense.

The prepositioning objective is based on the mission, the plan supporting the mission, and the force list supporting the plan. When NALMEB has a new mission, the Marine Corps will need to develop a generic plan to support it. We suggest that the plan be capabilities based and that it accommodate different sizes of MAGTFs, and different locations, response times, and modes of transportation. A new force list that describes small, medium, and large notional MAGTFs is required, to support the new plan. With the new plan and force list, the Marine Corps can calculate the NALMEB equipment requirement.

The current policy supporting NALMEB should be clarified. We suggest that the new policy divide the request, approve, notify, and execution processes into clear sections; describe the responsibilities of I&L, PP&O, and MFE; and describe the command and control for withdrawal operations.

The Marine Corps has an opportunity to restructure the NALMEB program for the post-September 11th world. To realign NALMEB to support the current strategic environment, we recommend the following:

- Change the NALMEB mission.
- Update the bilateral MOU.
- Update the prepositioning objective.
- Clarify the use of NALMEB policy.
- Develop procedures to integrate NALMEB with Marine, joint, and coalition forces.

Introduction

The DC, PP&O HQMC asked CNA to analyze the NALMEB prepositioning program. The objective of the study was to consider how the current strategic environment may affect the future of the NALMEB program. Specifically, we were asked to look at political implications of program change, potential missions, and implementation issues. This report completes the project, summarizing the findings and suggesting an implementation approach.

Background

The future of the U.S. military presence in Europe has been under active discussion for over a decade, since the demise of the Soviet Union and the end of the Cold War [1]. The NALMEB program is one part of the U.S. presence in Europe and was established in 1981 by a MOU between the governments of Norway and the U.S. [2]. The MOU provided for an aviation-heavy, but otherwise light mechanized, fly-in MEB to reinforce Norway. To facilitate a rapid deployment, equipment and a 30-day inventory of supplies are prepositioned in climate-controlled caves in central Norway.

The future of the NALMEB program has been examined in several studies. These include a Department of Defense Inspector General's report issued in 1995, a previous CNA "quick response" study in 1996, and a thesis written at the Naval Postgraduate School in 2000 [3, 4, 5]. Our initial research showed that a striking feature of the NALMEB program is how little the program has changed in response to world events and shifting U.S. interests [6].

The most notable change came in the mid-1990s when both Norway and the U.S. approved out-of-area use for NALMEB; some guidelines for this were published in 2001. Since then, NALMEB equipment and supplies have been used outside Norway in exercises and operations. Even so, the program still retains much of its original Cold War focus.

Recently, both parties have recognized the need to align the program with the current and future strategic environment. This openness to change, particularly on the Norwegian side, provides the opportunity to adjust the program to support the U.S. strategic focus.

As stated in the bilateral MOU, the primary mission of NALMEB is to support the defense of Norway. The NALMEB program (management, procedures, force structure, and equipment) is tailored to support this mission. The focus of our analysis was to determine what mission(s) the Marine Corps should use to tailor the future NALMEB program, determine whether those missions are politically feasible, and develop an implementation approach.

Methodology

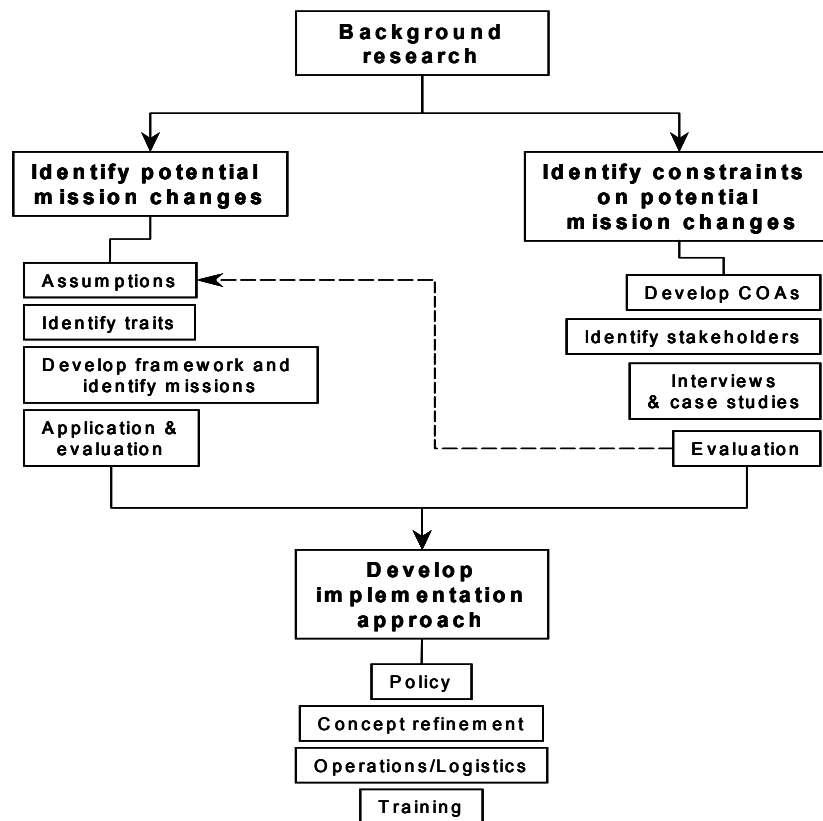
Our overall study approach has four sections, as shown in figure 1. First, we conducted background research on the NALMEB program, including employment in out-of-Norway operations and the U.S. strategic environment. From this research, we identified two paths. One path focused on identifying new missions, and the other focused on understanding the political feasibility of changing the program. We described the detailed methodologies for these two sections previously [7, 8], and integrate the findings in this report. In the final section of the analysis, we identified and addressed implementation issues, and developed an approach for implementing changes.

Overview

The remainder of this report is divided into six sections. In *A New NALMEB Concept*, we summarize our findings by integrating the missions and feasibility results [7, 8]. In *Equipment Mix and Cost Implications*, we estimate the costs associated with changing the equipment mix. In *Reducing Costs*, we explore how to expand the operational capabilities of NALMEB by integrating the program with other Marine Corps and coalition forces. *Issues* explores four high-level implementation issues and suggests an approach to changing the program management structure and policy. In *Implementation*, we provide an overall approach to transforming the NALMEB program. We conclude with *Recommendations*, in which we summarize our thoughts

on the future NALMEB program. A glossary of abbreviations and acronyms follows the main text.

Figure 1. Methodology



A new NALMEB concept

During the late 1970s, the U.S. and NATO were increasingly concerned about the possibility of a Soviet attack in the Northern Flank. To address these concerns, the Norwegian Ministry of Defense and U.S. Department of Defense signed a MOU in 1981, which states that the U.S. may provide a Marine Amphibious Brigade (now referred to as a Marine Expeditionary Brigade, or MEB) for the defense of Norway [2]. Some of the MEB capabilities specified by the MOU include two close air support squadrons, two air defense squadrons, support aircraft, approximately 75 heavy transport and light helicopters, and infantry and anti-tank weapons. In a few cases, the MOU lists quantities of equipment to be prepositioned in Norway, including 24 howitzers and 250 trucks, to facilitate rapid deployment. The MOU also describes the support provided by the Government of Norway, including over-snow vehicles, in-country transportation, and security and general maintenance for prepositioned equipment and supplies.

This was the NALMEB program at the beginning of our study—a program starting to move toward out-of-Norway operations, but still tailored to a single mission (the defense of Norway) that, apparently, no longer exists.

In this section, we describe a new concept for NALMEB. The new concept includes a more expeditionary NALMEB, providing a flexible, rapid, responsive force capable of supporting mid- to low-intensity missions. To develop this concept, we summarize our previous findings related to the constraints on program change and appropriate missions [7, 8].

Constraints on program change

The NALMEB program is governed by the MOU, and efforts to reengineer the program will require MOU revisions. The MOU is signed by officials of the U.S. Department of Defense and the

Norwegian Ministry of Defense. As noted above, the MOU defines the mission, outlines equipment sets, details forces provided by Norway and defines the ways in which the document can be modified. Specifically, changes in the MOU language must be approved by both sides, while termination may be effected unilaterally with one year's notice [2].

From the essential features of the MOU, we derived four courses of action—changing the mission description, changing the equipment mix, allowing Norwegian supporting forces to accompany U.S. forces on missions outside Norway, and terminating the program. We explored these options through stakeholder interviews and case studies. These are summarized below, and the details are presented in [8].

In summary, we found that there is bilateral support for changing the MOU language regarding the mission and equipment mix, and these options are politically feasible. The Government of Norway sees significant obstacles to co-deploying the Norwegian support forces (Host Nation Support (HNS) Battalion and Brigade 12) with U.S. forces, and would not be willing to commit to it in the MOU. Termination could be effected unilaterally, but both Norway and U.S. stakeholders would non-concur. The OSD, the U.S. signatory agency for the MOU, has the authority to terminate the program, but would be unlikely to approve such an action. Therefore, neither co-deployment nor termination is politically feasible.

The political feasibility analysis suggests that both the U.S. and Norway would support changes in the MOU content. Both parties have recognized the need to align the program with the current and future strategic environment, providing an opportunity to adjust the program to better support the U.S. strategic focus. Specific language changes in the MOU concerning missions outside of Norway and changes in the equipment mix to support such missions seem to have political support on both sides.

With these findings, we developed a set of basic assumptions as the starting point for deriving missions for NALMEB. These assumptions are:

- Prepositioned equipment and supplies will remain in Norway.
- Norway is receptive to additions or changes to the primary mission and MOU.
- Norway is receptive to equipment and supply adjustments.

New concept

Several entities have a stake in mission development: HQMC(PP&O), as the executive agent; Marine Forces Europe (MFE), as the Marine component in EUCOM; and the Office of Defense Cooperation (ODC), U.S. embassy, Oslo, as the U.S. military liaison with the Government of Norway. All agree that NALMEB should become more expeditionary, and as a result of recent bilateral discussion, one participant suggested the following as a new mission:

NALMEB is tailored to provide flexible, rapid, response force capable of meeting *selected contingency requirements* in NATO and for the combatant commanders.

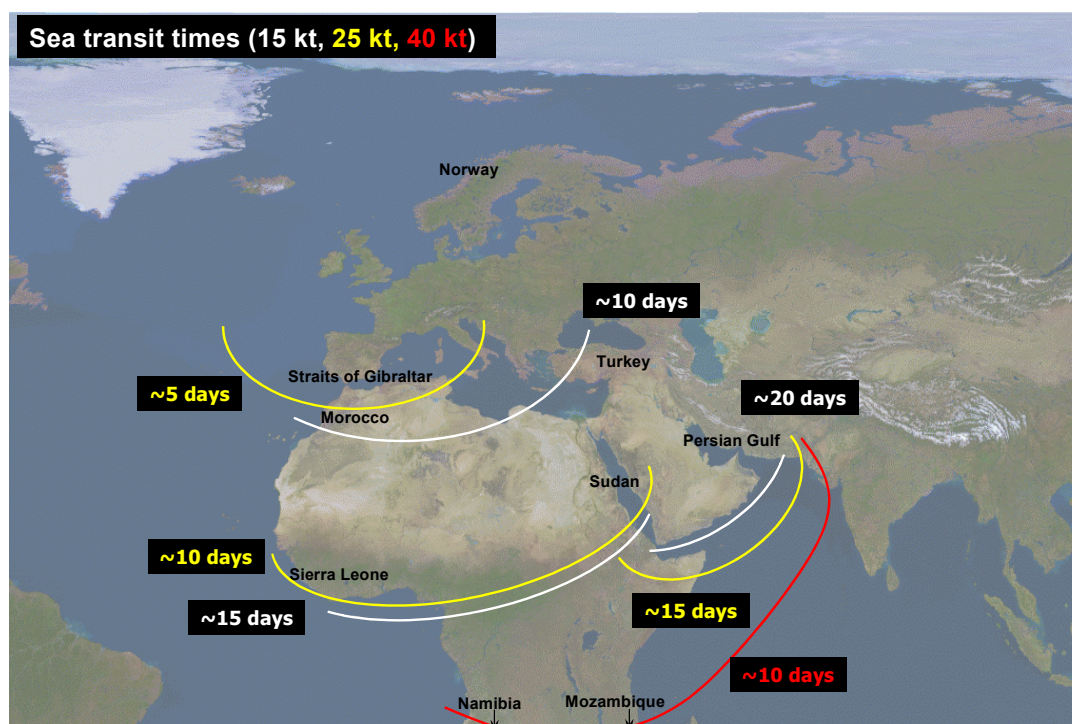
The reinforcement of Norway remains the cornerstone of NALMEB and Marine Corps prepositioning will continue to support our bilateral commitment.

Key to this statement is defining the scope of “selected contingency requirements.” Our approach was to identify and derive program traits, develop a decision framework, and apply the framework to identify appropriate missions. The findings are summarized below, and the details are presented in [7].

We are assuming that the prepositioned equipment and supplies will remain in central Norway, and that movement of equipment from the stored location to the operational area in a timely manner will be essential. To estimate the range of NALMEB, we looked at the approximate sea transit times to a variety of locations. The results, shown in figure 2, indicate that equipment from Norway can reach EUCOM/CENTCOM in 20 days at normal speed (15 knots) and as quickly as 10 days at high speed (40 knots).

By considering the current NALMEB program, Marine Corps involvement in past operations, MAGTF size, and locations of potential

Figure 2. Sea transit times

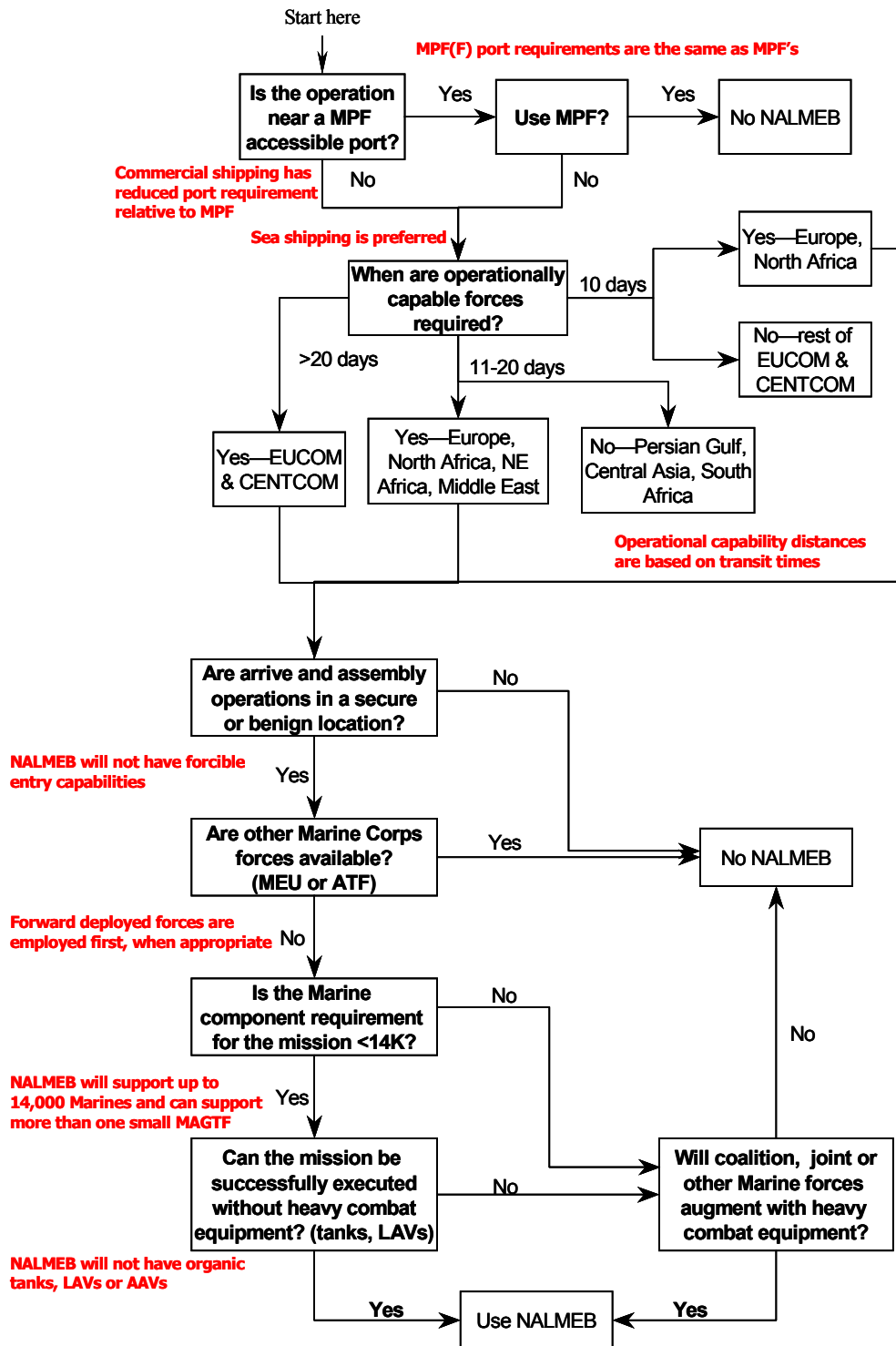


operations, we developed four future mission traits—selective and scalable withdrawal, a design for mid- to low-intensity operations, support of one medium-sized or several small MAGTFs, and support of operations in land-locked or undeveloped regions. These traits are aspects (or characteristics) of the Marine Corps or types of operations that can be supported by the NALMEB.

We used the traits and transit times to develop a mission framework for identifying the more appropriate NALMEB missions. The approach is based on METT-T (mission, enemy, terrain and weather, troops and support, and time available), which provides a decision logic for assessing whether the location, force requirement, and operational environment are suitable.

The framework and embedded assumptions are shown in figure 3. Starting at the “start here” arrow, the framework first considers whether the location of the mission is supportable by NALMEB. Our

Figure 3. Mission framework and assumptions



considerations of MPF availability and operationally capable force requirements are centered around four assumptions, shown in red. Once we have determined that the location of the mission is supportable by NALMEB, we consider whether the force requirements and operational environment are appropriate. This portion of the framework, beginning with the arrive and assemble operational environment, is based on several additional assumptions (shown in red).

The two most critical assumptions in the framework are that time lines for operationally capable forces are based on sea transit times and that NALMEB's organic combat capability will not increase. In particular, as the Marine Corps challenges these assumptions, the results can be assessed with the framework, and the future concept for NALMEB can evolve.

Figure 4 summarizes application of our framework to a range of military operations. We find that the following are **appropriate** for NALMEB (green in figure 4):

- Disaster relief/humanitarian assistance
- Peacekeeping.

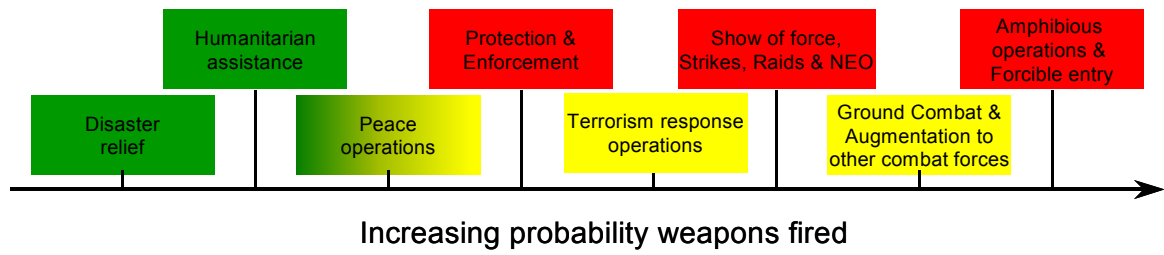
In addition, three categories are appropriate for NALMEB under specific operational conditions (yellow in figure 4):

- Peace enforcement
- Terrorism response operations
- Ground combat and augmentation to other combat forces.

Finally, three categories are **not appropriate** (red in figure 4):

- Protection and enforcement
- Show of force, strikes, raids, and NEOs
- Amphibious and forcible entry operations.

Figure 4. Appropriateness of missions for NALMEB



Equipment mix and cost implications

As NALMEB becomes more expeditionary, some adjustments to the equipment mix will likely be required. Previously, we identified capability shortfalls associated with more low-intensity missions outside of Norway, such as humanitarian assistance and disaster relief [7]. In addition, we looked at the equipment shortfalls associated with challenging our assumptions about combat equipment in NALMEB. Specifically, we used a 2015 MEB as a baseline for future MEB combat power [7]. We found specific shortfalls in engineering equipment, motor transportation, construction supplies, packaged petroleum oils and lubricants, medical supplies, and combat equipment [7].

The decision to replace or add equipment to NALMEB currently appears to be driven by cost. For example, modernization is planned only for the capabilities currently in the caves. Further, a recent Marine Requirements Oversight Council (MROC) decision stated that no new capabilities will be added to the program [9]. As the NALMEB program becomes more expeditionary, equipment mix changes are likely, suggesting the MROC may need to reconsider their earlier decision.

We estimate the cost of modernization and equipment mix changes. For equipment mix changes, we focused on deficiencies in the principal end items, as identified in [7].

Modernization

The AAO IPT (Approved Acquisition Objective Integrated Product Team) is chartered to review the acquisition objective set by MCCDC and Marine Corps Systems Command. The AAO IPT tailors the acquisition objective by unit and presents the findings as recommendations to the MROC. Once approved, the MROC distributes a decision memorandum, directing the program managers to plan for the new acquisition objective. We used these MROC decision memorandums to

develop a list of equipment scheduled for NALMEB modernization (table 1).

Table 1. NALMEB modernization^a

| Name | AO | PrO | Unit cost | Fielding | Ref |
|-------------------------------|------------|------------|------------------|------------------|---------------------|
| 25-ton Crane | 5 | 5 | \$229,000 | FY07 | [10, 12] |
| 250 CFM Compressor | 10 | 10 | \$31,469 | FY05-FY06 | [10, 13] |
| 7.5-ton Crane | 18 | 17 | \$108,000 | FY06-FY08 | [10, 12] |
| Dozer D7G | 6 | 22 | \$192,000 | Not avail | [10, 14, 15] |
| Extended boom forklift | 46 | 46 | \$96,146 | FY04-FY05 | [10, 16] |
| Floodlights set | 26 | 5 | Not avail | Not avail | [10, 17] |
| MTVR | 252 | 252 | \$140,000 | FY04 | [10, 18] |
| Tractor, all wheel drive | 8 | 41 | \$180,000 | FY03-FY04 | [10, 19] |
| Welding equipment | 7 | 7 | Not avail | Not avail | [10, 20] |
| Boat, bridge erection | 3 | 2 | \$358,500 | Not avail | [10, 21] |
| HMMWV A2 | 574 | 542 | \$76,700 | FY08 | [10, 11, 22] |
| Mobile tactical shelter | 9 | 57 | \$9,849 | FY00 | [12, 23] |
| Refueling capability, flatbed | 32 | 14 | \$175,000 | FY04 | [12, 24] |
| LVSr | 170 | 58 | \$371,000 | FY08-FY09 | [12, 15, 25] |
| LRFT | | 37 | \$51,500 | FY02 | [12] |
| Dozer D7G ripper | 5 | Not avail | Not avail | Not avail | [10] |
| Dozer D7G winch | 5 | Not avail | Not avail | Not avail | [10] |
| EROWPU | 6 | Not avail | Not avail | Not avail | [10] |
| MC 1150 | 9 | Not avail | Not avail | Not avail | [10] |
| MC 1155 | 9 | Not avail | Not avail | Not avail | [10] |
| Wheeled excavator | 1 | Not avail | Not avail | Not avail | [10] |
| Mobile field kitchen | 7 | Not avail | Not avail | Not avail | [10] |
| M105 trailer | 20 | Not avail | Not avail | Not avail | [12] |
| M149 trailer | 80 | Not avail | Not avail | Not avail | [12] |
| M353 trailer | 199 | Not avail | Not avail | Not avail | [12] |
| M116 trailer | 67 | Not avail | Not avail | Not avail | [12] |
| M870 trailer | 12 | Not avail | Not avail | Not avail | [12] |

a. AO=acquisition objective; PrO=procurement objective; ref=references. See text for explanation of "not available"

The quantity of equipment to be bought (the procurement objective) is generally different from the acquisition objective. In addition, information on the procurement objectives is not centralized but is

maintained by each program manager. As programs move closer toward fielding, the program manager develops a User's Logistics Support Summary (ULSS) that shows the quantity, location, fielding date, and cost of the new equipment. We collected the ULSS for 15 of the 27 items scheduled for modernization. For two of the 15, the floodlights and welding equipment, no unit costs were listed; this suggests that the programs are currently unfunded. The status of the other 12 items is unclear. The available information is summarized in table 1.

We estimate that the Marine Corps will spend approximately **\$123 million** in procurement funding to modernize NALMEB equipment between FY00 and FY08. Of the \$123 million, 80 percent support three items—the MTRV, HMMWV A2, and LVSR. The MTRV will replace the 5-ton truck, beginning in FY04, and the HMMWV A2 will replace the HMMWV, beginning in FY08. In total, 252 MTRVs will be prepositioned at a total cost of \$35 million and 542 HMMWV A2s at a total cost of \$41.5 million. The LVSR is still early in the procurement process, and the ULSS was not available. Instead, we assumed that the legacy LVSs would be replaced by the LVSR, and estimated the unit cost from HQMC (P&R) POM submissions [25]. It is likely that both the quantity and unit cost of the LVSR will change as the acquisition process continues.

The fielding of the MTRV and HMMWV A2 will result in a large surplus of legacy equipment. Proceeds from the disposal of the 5-ton trucks and HMMWVs through domestic or foreign military sales could off-set some of the modernization costs. Sale of surplus equipment is usually considered after reutilization and donation screening, and is a responsibility of the Defense Logistics Agency (DLA) [26]. Sale of surplus equipment, especially foreign military sales, is subject to extensive regulation, and DLA has the responsibility to ensure that all materiel shipped follows the U.S. security assistance policies and foreign military sales program procedures [27]. The sale of surplus Marine Corps equipment will be coordinated between the program manager at Marine Corps Systems Command, the logistics managers at Marine Corps Logistics Bases, and DLA.

Equipment shortfalls

Previously, we identified NALMEB capability shortfalls for humanitarian assistance/disaster relief operations, provided by the HNS Battalion, and organic to the 2015 MEB [7]. We estimated the likely shortfalls in NALMEB for a large-scale humanitarian assistance/disaster relief operation by comparing the NALMEB equipment and supplies to those used in Operation Restore Hope (in Somalia) [7]. The Norwegian HNS Battalion will not deploy with NALMEB for operations outside of Norway, so we assessed shortfalls resulting from the loss of its equipment as well.

In tables 2-4, we summarize the major equipment shortfalls identified in [7] and the unit price for each piece of equipment. If the Marine Corps has a planned new acquisition for a specific equipment shortfall, we used the new acquisition unit cost. Otherwise, we used the replacement cost from the Marine Corps Logistics Management Information System (LMIS) [14].

Table 2 shows the major ground equipment shortfalls for humanitarian assistance/disaster relief missions. As detailed in [7], we found these shortfalls by comparing the NALMEB equipment requirement to the equipment used in Operation Restore Hope. We looked at shortfalls in the prepositioning objective, that is, the equipment requirement for a Somalia-like operation compared to the equipment prepositioned (labeled “PO shortfall” in table 2). To take into consideration the fly-in echelon, we also looked at shortfalls compared to the overall NALMEB equipment requirement (labeled “requirement shortfall” in table 2).

We calculated several different costs associated with increasing the NALMEB low-intensity conflict ground capability. First, we looked at the prepositioning objective and requirement shortfalls in engineering (bravo TAMCNs) and motor transportation (delta TAMCNs). We estimate that it will cost about **\$11 million** to meet the requirement shortfalls and **\$16 million** to meet the prepositioning shortfalls for engineering and motor transportation assets. We also looked at a range of combat (echo TAMCNs) capabilities, including LAVs only (**\$4.8 million**), LAVs and tanks (**\$9.6 million**), and full capability (**\$150**

Table 2. NALMEB equipment shortfalls for an Operation Restore Hope humanitarian assistance-like mission

| Equipment type | TAMCN | Name | PO shortfall | Requirement shortfall | Unit cost [14] | Planned modernization |
|-----------------|-------|----------------|--------------|-----------------------|-------------------|-----------------------|
| Engineering | B0971 | Generator | 6 | 6 | \$20,232 | No |
| | B1016 | Generator | 10 | 10 | \$18,000 | No |
| | B1082 | Road grader | 5 | 1 | \$125,000 | No |
| | B2482 | Tractor | 3 | 2 | \$99,000 | No |
| Motor Transport | D0235 | 40-ton Trailer | 110 | 97 | \$45,000 | No |
| | D1001 | Ambulance | 29 | 4 | \$67,000 | No |
| | D1072 | Dump truck | 13 | 1 | \$101,000 | No |
| | D1134 | Tractor | 90 | 77 | \$71,000 | No |
| | D1212 | Wrecker | 2 | 2 | \$135,000 | No |
| Combat | E0796 | AAV C2 | 1 | 1 | \$13,000,000 [25] | AAAV |
| | E0846 | AAV | 10 | 10 | \$13,000,000 [25] | AAAV |
| | E0947 | LAV-25 | 5 | 5 | \$801,000 | No |
| | E0948 | LAV-L | 1 | 1 | \$825,000 | No |
| | E1888 | M1A1 tank | 2 | 2 | \$2,393,000 | No |

million). This large increase in cost is due to the high estimated unit cost of the AAAV [25].

Deployments out of Norway will not have the support currently provided by the Norwegian HNS Battalion. Table 3 shows the major ground equipment requirement shortfalls calculated in [7]. These are combat service support shortfalls *in addition* to those identified in table 2. Some pieces of equipment do not have a U.S. equivalent. For those, the unit costs were provided by the Norwegian Defense Logistics Organization (NDLO), the military command in Norway with acquisition authority [29]. We estimate that it will cost about **\$23 million** to meet these shortfalls.

Table 4 shows the requirement shortfalls when NALMEB is compared to a 2015 MEB [7]. This equipment mix was designed by MCCDC to have several desired capabilities, not to meet a specific threat [30]. In

Table 3. Additional shortfalls after HNS Bn equipment is removed

| Equipment type | TAMCN | Name | Requirement shortfall | Unit cost | Planned modernization | Ref |
|----------------|-------|--------------------|-----------------------|-----------|-----------------------|------|
| Motor | D1002 | Ambulance | 36 | \$31,000 | No | [14] |
| Transport | D1059 | 5-ton Truck | 130 | \$140,000 | MTVR | [18] |
| | D1212 | Wrecker | 5 | \$135,000 | No | [14] |
| Engineering | B0591 | Back hoe | 6 | \$70,000 | No | [28] |
| | B2567 | Front loader | 6 | \$92,000 | No | [14] |
| | B2464 | Bulldozer | 3 | \$192,000 | No | [14] |
| | B1082 | Road grader | 1 | \$125,000 | No | [14] |
| | | Excavator | 3 | \$172,000 | No | [29] |
| | | Dump truck trailer | 6 | \$68,700 | No | [29] |
| | | Drill rig | 1 | \$282,000 | No | [29] |

particular, the 2015 MEB configuration has sufficient combat power for high-intensity missions such as forcible entry or amphibious assaults. We estimate that configuring NALMEB with a 2015 MEB-like capability will cost at least ***\$1.4 billion***.

Table 4. NALMEB equipment shortfalls for a 2015 MEB-like capability

| Equipment type | TAMCN | Name | Requirement shortfall | Unit cost | Ref |
|-----------------|-------|-----------|-----------------------|---------------|------|
| Combat | New | AAAV | 88 | \$13,000,000 | [25] |
| | E0947 | LAV | 50 | \$801,000 | [14] |
| | E1888 | M1A1 Tank | 24 | \$2,393,000 | [14] |
| | New | LW155 | 15 | \$1,620,000 | [25] |
| | New | EFSS | 7 | Not available | |
| | New | HIMARS | 5 | \$16,250,000 | [25] |
| Motor Transport | New | HMMWV-A2 | 283 | \$76,700 | [22] |
| | New | MTVR | 106 | \$140,000 | [18] |
| | New | LVSr | 29 | \$370,000 | [25] |

Summary

In table 5, we summarize various cost options and reference each option back to the earlier tables. Option 1 is the cost associated with the planned modernization of NALMEB equipment. This is the base cost, and the other options can be considered additional to option 1.

Options 2 through 4 summarize a range of additional combat service support low-intensity conflict capabilities. Option 2 shows the cost associated with meeting the requirement shortfall in combat service support (CSS) equipment specific for a Somalia-like mission. Option 3 shows the cost associated with meeting the requirement shortfalls associated with losing the Norwegian HNS Battalion. Options 4 is a combination of option 2 and 3, showing the costs associated with establishing a robust low-intensity conflict (such as humanitarian assistance/disaster relief) combat service support capability in NALMEB.

Options 5 and 6 summarize the costs to provide a mid-intensity mission capability. Option 5 adds a small number of LAVs to the CSS assets; and option 6 is more robust, adding tanks as well.

Options 7 and 8 summarize the costs to provide two levels of high-intensity mission capability. Option 7 adds the AAVs, tank, and LAVs to the CSS assets, and option 8 is the cost of a 2015 MEB-like capability.

These options provide the building blocks to develop a robust capability. For example, a relatively complete redesign of the NALMEB program may include modernization as planned (option 1) and a complete CSS package with a small number of LAVs (option 5), for a total cost of \$162 million. Another option of interest is modernization for a 2015 MEB (option 8), for a total cost of \$1.5 billion.

Table 5. Cost summary for NALMEB options

| Option | Category/ intensity | Description | Includes ^a | Cost (millions) |
|--------|------------------------|------------------------------------------|----------------------------------------------------------------------|--------------------|
| 1 | Planned | Modernization | Table 1, available costs | \$123 |
| 2 | Low | HA/DR CSS capability | Table 2, requirement shortfall quantities, B and D TAMCNs | \$11 |
| 3 | Low | HNS capability | Table 3, available costs | \$23 |
| 4 | Low | Total CSS HA/DR capability | Option 2 plus option 3 | \$34 |
| 5 | Low to mid | Advanced HA/DR capability, includes LAVs | Option 4 plus table 2, E0947, quantity 6 | \$39 |
| 6 | Low to mid | Advanced HA/DR capability, without AAAV | Option 4 plus table 2, E0947 (qty 6), E1888 only | \$44 |
| 7 | High | HA/DR combat capability | Option 4 plus table 2, E TAMCNs, substitute AAAV for E0796 and E0846 | \$184 |
| 8 | High | 2015 MEB capability | Table 4, available costs | \$1,405 |

a. TAMCN = table of authorized materiel control number; B = engineering equipment; D = motor transport equipment, E = combat equipment

An integrated NALMEB

We considered whether it is feasible to augment NALMEB with other Marine or NATO forces, instead of buying new equipment to make up capability shortfalls. This would reduce the cost of changing the equipment mix as well as expand the range of operational missions supported. Consider, for example, the lack of prepositioned combat equipment in NALMEB. If combat equipment could be contributed from coalition, joint, or other Marine forces, NALMEB could be used for missions currently considered appropriate under specific conditions (see figure 3). These missions—peace enforcement, terrorism response operations, and ground combat—would greatly expand the flexibility of the program (see figure 4).

The prepositioned equipment and supplies could be used to support several small MAGTFs. At times, these small MAGTFs might be engineering and transportation heavy, but they would still require some limited combat capabilities that could be supported by detachments from other sources. To expand the operational capabilities while simultaneously reducing the cost of adding capabilities, we considered integration of NALMEB with the Expeditionary Strike Group (ESG), Maritime Prepositioning Force (MPF), and Norwegian FIST-H (Fast Reaction Force).

Integration with ESG

An ESG combines the capabilities of an Amphibious Ready Group (ARG) and MEU(SOC) with surface and subsurface combatants in order to provide enhanced offensive and defensive capabilities [31]. At the center of the ESG is the MEU(SOC), and, at least initially, the equipment load in support of MEU(SOC) missions is not expected to change with the group composition.

As we considered integrating NALMEB with a forward-deployed MEU(SOC) for some operations, we used the 13th MEU(SOC)

equipment load-out from a 2001 deployment as a notional equipment set [32]. While each commander can adjust the MEU(SOC) equipment load, there appears to be some continuity between deployments. For example, most deployments have four tanks, 15 amphibious assault vehicles (AAVs), and 15 light armored vehicles (LAVs). Occasionally, more LAVs are added at the expense of tanks.

Table 6 compares the MEU(SOC) equipment with the shortfalls previously identified for a Somalia-like humanitarian assistance operation [7]. As seen in table 6, the MEU(SOC) equipment is sufficient to make up the NALMEB deficiencies in combat equipment, but contributes only modestly to the engineering and motor transport shortfalls. For example, while the MEU(SOC) covers all deficiencies in tanks, AAVs, and LAVs, it provides too few ambulances (28), 5-ton trucks (27), and wreckers (1) relative to the calculated NALMEB shortfalls. Most notably, with the exception of a tractor and two front-end loaders, the engineering equipment shortfalls for low-intensity operations are not made up in the MEU(SOC) load-out.

Integration with MPF

NALMEB and MPF could work together for some missions. In this section, we consider whether MPF could address the NALMEB capability shortfalls for a major humanitarian assistance operation [7]. Specifically, we consider how NALMEB and MPF can complement each other from several different angles. First, we explore whether the MPF load is sufficient to meet NALMEB equipment shortfalls. Next, we look at the status of construction and medical supplies for potential humanitarian missions. Finally, we look at MPF capability sets that provide initial critical capabilities for arrival and assembly operations.

Table 6 compares the typical MPF equipment with the shortfalls identified previously. The MPF equipment data are from MPS-2, as reported in the fall of 2001 [32]. Some of the NALMEB shortfalls are not readiness-reportable items, and for these we used the MPF equipment quantities from [33]. (A list of Marine Corps ground equipment readiness-reportable equipment can be found in [34].) With the exception of five items (table 6, shown in bold under MPF), all

Table 6. Potential MEU(SOC) and MPF contributions

| Equip type | TAMCN | Name | Short | MEU(SOC) | | | MPF | | |
|-------------------------------------------|--------------|-------------------------------|--------------|----------|------------------------|-----------|-----------|------------------------|------|
| | | | | Quantity | Remaining shortfall | Ref | Quantity | Remaining shortfall | Ref |
| Engineer | B0591 | Back hoe | 6 | 0 | 6 | NA | 1 | 5 | [33] |
| | B0971 | Generator | 6 | 0 | 6 | [32] | 10 | 0 | [32] |
| | B1016 | Generator | 10 | 0 | 10 | [32] | 23 | 0 | [32] |
| | B1082 | Road grader | 2 | 0 | 2 | [32] | 6 | 0 | [32] |
| | B2464 | Bulldozer | 3 | 0 | 3 | NA | 4 | 0 | [33] |
| | B2482 | Tractor | 2 | 1 | 1 | [32] | 6 | 0 | [32] |
| | B2567 | Front loader | 6 | 4 | 2 | [32] | 37 | 0 | [32] |
| Motor Trans- port | D0235 | 40-ton Trailer | 97 | 0 | 97 | [32] | 15 | 82 | [32] |
| | D1001 | Ambulance | 4 | 1 | 3 | [32] | 29 | 0 | [32] |
| | D1002 | Ambulance | 36 | 27 | 9 | [32] | 19 | 0 | [32] |
| | D1059 | 5-ton Truck | 130 | 27 | 103 | [32] | 351 | 0 | [32] |
| | D1072 | Dump truck | 1 | 1 | 0 | [32] | 49 | 0 | [32] |
| | D1134 | Tractor | 77 | 0 | 77 | [32] | 27 | 50 | [32] |
| | D1212 | Wrecker | 7 | 1 | 6 | [32] | 31 | 0 | [32] |
| Combat | E0796 | AAV C2 | 1 | 1 | 0 | [32] | 9 | 0 | [32] |
| | E0846 | AAV | 10 | 13 | 0 | [32] | 96 | 0 | [32] |
| | E0947 | LAV-25 | 5 | 13 | 0 | [32] | 14 | 0 | [32] |
| | E0948 | LAV-L | 1 | 2 | 0 | [32] | 3 | 0 | [32] |
| | E1888 | M1A1 tank | 2 | 4 | 0 | [32] | 58 | 0 | [32] |
| Engineer | | Excavator | 3 | 0 | 3 | NA | 2 | 1 | [33] |
| | | Dump truck trailer | 6 | 0 | 6 | [32] | 0 | 6 | [32] |
| | | Drill rig | 1 | 0 | 1 | NA | 1 | 0 | [33] |
| Shortfall cost estimate (millions) | | | \$184 | | \$29 | | | \$8.1 | |

the NALMEB equipment shortfalls can be covered by MPF. The remaining items, mostly heavy engineering equipment, would cost approximately \$8 million to add to the NALMEB program.

We found large shortfalls in construction materials for a Somalia-like humanitarian assistance/disaster relief mission, and MPF will not significantly change these shortfalls. Like NALMEB, MPF has limited construction supplies prepositioned aboard. We summarize the requirements, prepositioned quantities, and shortfalls in table 7.

Table 7. Potential MPF and NALMEB contributions to construction material

| Name | Requirement | NALMEB | MPF [33] | Shortfall |
|----------------------------|----------------|---------------|----------------|----------------|
| Sheets of plywood | 17,900 | 1000 | 2000 | 14,900 |
| Board lumber (feet) | 341,000 | 50,000 | 165,000 | 126,000 |
| Pounds of nails | 22,700 | 4000 | 1440 | 17,260 |
| Bags of cement | 30,600 | 0 | 0 | 30,600 |
| Rolls of concertina | 811 | 635 | 560 | 0 |
| Roofing sheets | 176 | 0 | 0 | 176 |

Table 8. Potential MPF and NALMEB contributions to medical/dental supplies

| Name ^a | Requirement | NALMEB | MPF [33] | Shortfall |
|-------------------|-------------|-----------|-----------|-----------|
| AMAL 621 | 1 | 0 | 0 | 1 |
| AMAL 624 | 2 | 0 | 0 | 2 |
| AMAL 632 | 33 | 12 | 15 | 6 |
| AMAL 634 | 41 | 19 | 24 | 0 |
| AMAL 636 | 33 | 26 | 16 | 0 |
| AMAL 640 | 27 | 25 | 30 | 0 |
| AMAL 664 | 1 | 0 | 0 | 1 |
| AMAL 699 | 1 | 0 | 0 | 1 |

a. AMAL=Authorized Medical Allowance List.

We summarize the medical and dental supplies requirement, prepositioned quantities, and shortfalls in table 8. MPF makes up all of the capability shortfalls for ward consumables (AMAL 634), basic consumables (AMAL 636), and operating room consumables (AMAL 640). A portion of the triage (AMAL 632) shortfalls are also covered.

MPF has prepackaged, easily accessible capability sets to provide initial, critical capabilities during arrival and assembly operations. Some of these capability sets could be used to augment the NALMEB equipment and supplies to provide more robust combat service support capabilities required during humanitarian assistance/disaster relief operations. Previously, we showed that NALMEB would have limited capabilities in the areas of developing water supply sources, providing bulk fuel, providing power services, restoring essential sanitation services, and constructing and managing a large camp [7]. MPF capability sets that partially off-set these shortfalls are shown in table 9.

Table 9. Select MPF capability sets [35]

| Capability set | Description | Shortfall partially addressed [7] |
|----------------|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|
| Food services | Supports up to 4,000 personnel. | Construct and run field kitchens. |
| Habitability | Each set provides 15 tents and 30 camouflage screening systems. | Run camps and life support centers. |
| Medical | Each set provides surgical and patient holding capabilities for 20 casualties. | Run camps and life support centers. |
| Electric power | Has a four container set for direct support, general purpose base camp support, and long-term humanitarian assistance support. | Provide power services. |
| Water | Each set provides two reverse osmosis water purification units and four 20,000 gallon storage tanks. | Provide bulk water |

Two NALMEB capability shortfalls, vertical construction and well drilling, could be addressed by including Naval Construction Forces (Seabees) in operations that deploy outside of Norway. The Naval Mobile Construction Battalion (NMCB) is one of three Seabee units that support MPF operations. NMCB has vertical construction and well drilling as primary responsibilities, critical tasks that NALMEB cannot execute with organic assets [36]. In addition, NMCB can support a variety of combat service support tasks required for large humanitarian or disaster operations, such as construction, repair, and maintenance of camps; improvement of roads and airstrips; soil stabilization; damage assessment and repair; and production of concrete [36].

Careful planning is required to take advantage of the complementary nature of NALMEB and MPF. For example, many of the MPF supplies and pieces of equipment are duplicates of the NALMEB assets, suggesting that the equipment load for the EUCOM MPF could be somewhat smaller than those for the CENTCOM and PACOM squadrons. If the equipment and supply requirement is sufficiently smaller, the EUCOM squadron may require fewer MPF ships and still retain the same operational capability and presence in the theatre. The open ships can then be redistributed between CENTCOM and PACOM to address continuing tensions in these regions. While the potential costs of this type of concept of operations require careful consideration, overall, *this approach offers the Marine Corps an opportunity to increase its global forward presence and responsiveness with the current capabilities.*

Integration with the Norwegian FIST-H

In the previous sections, we explored how NALMEB could integrate with other Marine Corps forces. Here, we shift our focus to NALMEB integration with coalition forces. As an example of a coalition force, we looked at “expeditionary” capabilities within Norway’s armed forces. We recognize that there are considerable political constraints on co-deployment of Marines with Norwegian forces.¹ The purpose of this analysis is to show how the two forces could work together during politically appropriate circumstances, and suggest that NALMEB may be a logical U.S. contribution to the NATO reaction force.

Historically, Norway’s defense structure has consisted of large, static forces with a long reaction time. Their task was to defend the country against a massive attack from the former Soviet Union. Today, Norway’s defense establishment recognizes that there are no direct threats. At the same time, the environment of post-Cold War Europe and the terrorist attacks on the U.S. have broadened Norway’s views of security interest. To meet these new challenges, Norway’s armed services have begun a major restructuring program [37].

As part of the restructuring, Norway has stood up a high readiness force called FIST-H. This force is the Norwegian contribution to UN and NATO international operations, including the NATO reaction force. Unlike most of the defense structure, FIST-H is designed to deploy heavy combat power overseas within ten days to support humanitarian, peace, and Article 5 operations.² The FIST-H units, response times, manpower, and major capabilities are summarized in table 10 [38, 39].

-
1. Commitment of Norwegian forces to international operations is politically sensitive in Norway. The Storting (the Norwegian parliament) tends to support NATO- and UN-sanctioned operations only.
 2. Article 5 is the NATO agreement that an attack on one member of the alliance is an attack on all members.

Table 10. FIST-H [38, 39]

| Major units | Units | Response times | T/O | Capabilities |
|----------------------------------|---------------------------|----------------|------------|------------------------------------------------------------------------------------------------|
| Fast Reaction Force | Telemark Battalion | 10 days | 712 | 30 days of supplies |
| | | | 525 | Mechanized infantry battalion 26 Bradley fighting vehicles 13 tanks |
| | National Support Element | | 187 | Combat service support |
| Leadership Element | | 30 days | 30 | Coordinate with NJHQ and CJTF |
| Theater Enabling Force | 4 units | | 185 | Logistics and force protection |
| Implementation Task Force | | | 116 | Civilian and military engineering capabilities |
| Reinforcement Force | 5 units | | 400 | 26 tanks 2 FOX vehicles Decontamination equipment |
| Reaction & Follow-on Forces | 4 units | 180 days | 850 | Up to 73 wheeled armored vehicles |

Norway's Fast Reaction Force is the rapid response element of FIST-H. This force is composed of the Telemark Battalion (a mechanized infantry battalion) and combat service support group. The Fast Reaction Force contains heavy combat equipment, the major capability shortfall of NALMEB; thus, it might be a near-perfect complement to NALMEB. A closer look shows that the two units could have been designed to work together. In addition to the complementary capabilities, the ground equipment of the two organizations uses the same ammunition and fuel—so should have a high degree of interoperability. The one area that may have interoperability shortcomings is communications equipment.

Another area of NALMEB capability shortfalls is engineering and construction. The FIST-H provides extensive capabilities in this area after 30 days with the Implementation Task Force. This force has the equipment and experience to build camps; build and maintain roads; generate power; drill wells; improve infrastructure; establish sanitation services; clear mines from large areas; produce rock; and establish civilian water supplies [38]. Of these capabilities, NALMEB is not

capable of establishing alternative water supplies or sanitation services, clearing mines, or producing rock.

The complementary nature of FIST-H and NALMEB offers the Marine Corps another avenue to increase the range of missions supported by NALMEB without large expenditures. In addition, partnership with FIST-H (or other NATO partners) brings political benefits, including a stronger bilateral relationship and a show of continuing commitment to NATO. To develop coalition options further, the Marine Corps will likely need to coordinate with EUCOM and the OSD.

Issues

The NALMEB program was built around the defense of Norway. As the focus of the program changes to outside-of-Norway operations, many aspects of the original management, processes, procedures and command relationships must necessarily change as well. In this section, we provide a quick-look at several issues. These issues will need further analysis once the Marine Corps decides on the future NALMEB program and reaches consensus on the mission set.

The remainder of this section considers the following implementation issues:

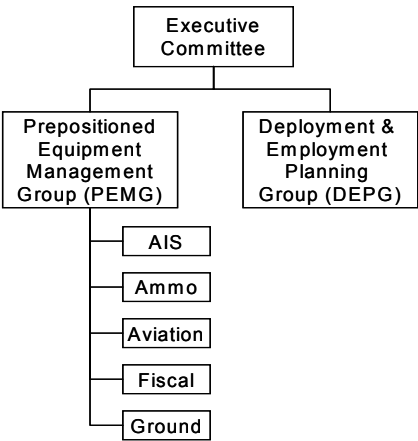
- Program management
- Out-of-Norway operations process
- Request, approve, and notify processes
- Command and control of withdrawal operations.

Program management

The current program management structure of the NALMEB program is described in the Terms of Reference (TOR), which was last updated in 1999 and is currently undergoing revisions [40]. The TOR outlines a bilateral management approach and assigns the Commandant of the Marine Corps (U.S.) and Chief of Defense (Norway) as responsible agents.

Program oversight is delegated to the executive committee (EXCOM), with O6-level membership from both Norway and the Marine Corps. Daily management falls to the PEMG and DEPG (figure 5). The PEMG is focused on logistics, and is co-chaired by a Marine Corps and a Norwegian Army major. In addition, the PEMG is supported by five subgroups—automated information systems

Figure 5. Current NALMEB management



(AIS), ammunition, aviation, fiscal, and ground. The DEPG is focused on operations, and is currently co-chaired by a Marine Corps lieutenant colonel and Norwegian Navy commander. The membership of the EXCOM, DEPG, and PEMG has changed recently to reflect changes in the NALMEB program and Norway defense establishment, summarized in table 11.

Table 11. Program management leadership

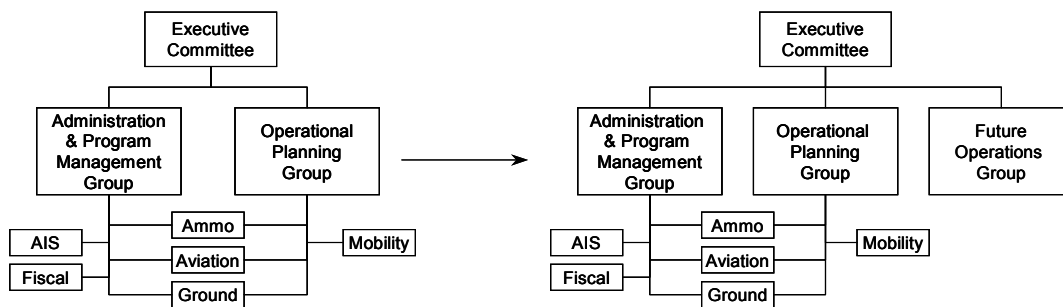
| Committee | Original members [40] | Current members |
|-----------|---------------------------------------------------------------------|-------------------------------------------------|
| EXCOM | HQMC (PP&O) | HQMC (PP&O) |
| | CHOD (Logistics Planning) | Marine Forces Europe (MFE) CHOD |
| PEMG | HQMC (I&L) | HQMC (I&L) |
| | Marine Corps Logistics Bases (MCLB), Blount Island Command (BIC) | Marine Corps Logistics Command (LOGCOM), BIC |
| DEPG | ARMYMATCOMNOR | NDLO/LAND |
| | II MEF (G4, G5) | MFE (G5) |
| | COMSONOR/HQNORTH | National Joint Headquarters (NJHQ) |

The DEPG is focused on managing the deployment, reception, redeployment, employment, and retrograde of NALMEB based on the defense-of-Norway mission. Specific responsibilities include addressing operational planning issues, resolving operational issues of the PEMG and its subgroups, and providing information on operations.

The PEMG is focused on logistics and program oversight. Specific responsibilities include ensuring management compliance, resolving DEPG logistics issues, providing fiscal and budget oversight, resolving technical issues, and providing oversight and management of logistics actions.

As NALMEB becomes more expeditionary, we suggest that the program management structure be adjusted to support the new mission(s), and avoid overlap and redundancy between the DEPG and PEMG. Figure 6 suggests a transitional management structure for the program. The new management separates the administrative and program management activities from the operational considerations required to change the program.

Figure 6. Proposed NALMEB management



Consider the structure on the far left of figure 6. The EXCOM remains in place and is responsible for providing guidance and decisions. The PEMG is replaced by the Administration and Program Management Group (APMG). The APMG is responsible for management compliance, fiscal and budget oversight, technical issues, and oversight and management of programmatic logistics actions. These types of logistics actions include routine maintenance, stock rotation, and modernization of equipment and supplies. To support these responsibilities, the APMG oversees the fiscal and automated information subgroups.

The other three subgroups (ammo, aviation, and ground) report to APMG for program management and to the Operational Planning

Group (OPG) for operational issues/concerns. These three subgroups currently support both programmatic activities, such as stock rotation and modernization; and operational activities, such as execution of equipment withdrawals. The intent is for the ammo, aviation, and ground subgroups to attend both the APMG and OPG meetings, and request guidance from the appropriate chain.³

The operational logistics responsibilities fall to the OPG, which is responsible for all aspects of operations. These include identifying, addressing, and resolving issues in operational logistics, mission execution, planning, and reconstitution. In addition to the ground, ammunition, and aviation subgroups, we suggest adding a strategic mobility group. As NALMEB is considered for operations in both EUCOM and CENTCOM, rapid movement of equipment and supplies becomes critical. The new strategic mobility subgroup should include members from NDLO/LAND Transportation office and MFE.

The OPG is also responsible for the development of future concepts of operation and plans. As NALMEB becomes more expeditionary and the operational tempo increases, it may become necessary to split the future concepts of operations and plans responsibilities into a Future Operations Group (shown on the right of figure 6).

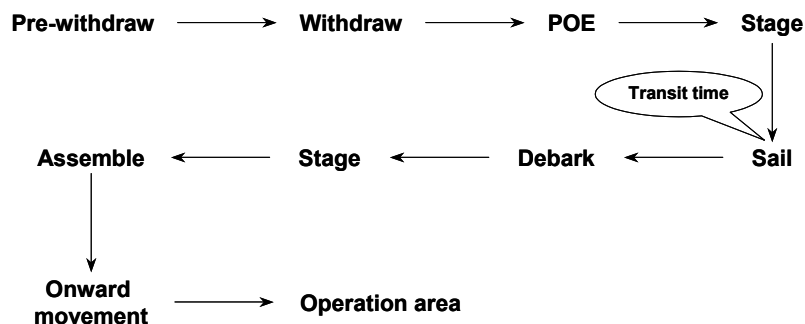
Membership in the APMG should include at least NDLO/Land and HQMC (I&L). Membership in the OPG should include NDLO/Land; LOGCOM, BIC; MFE; HQMC (PP&O); and NJHQ. Each subgroup should have one representative from Norway and one from the U.S. Generally, the value of the observers in the management process is minimal, and future meetings and organizations should be limited to principals only.

3. The ammo, aviation, and ground subgroups do not need approval from both the APMG and OPG for programmatic decisions. These decisions fall to the APMG, following the guidance of the EXCOM.

Out-of-Norway operations

Potential appropriate outside-of-Norway missions are fundamentally different from NALMEB's original mission. Today, they would likely be ad hoc, meaning that neither the U.S. nor Norway has standing plans on how to withdraw, stage, and move the equipment and supplies for operations outside of Norway. Figure 7 suggests a notional process for considering the logistics, operations, and planning implications for missions outside of Norway.

Figure 7. Out-of-Norway operations process



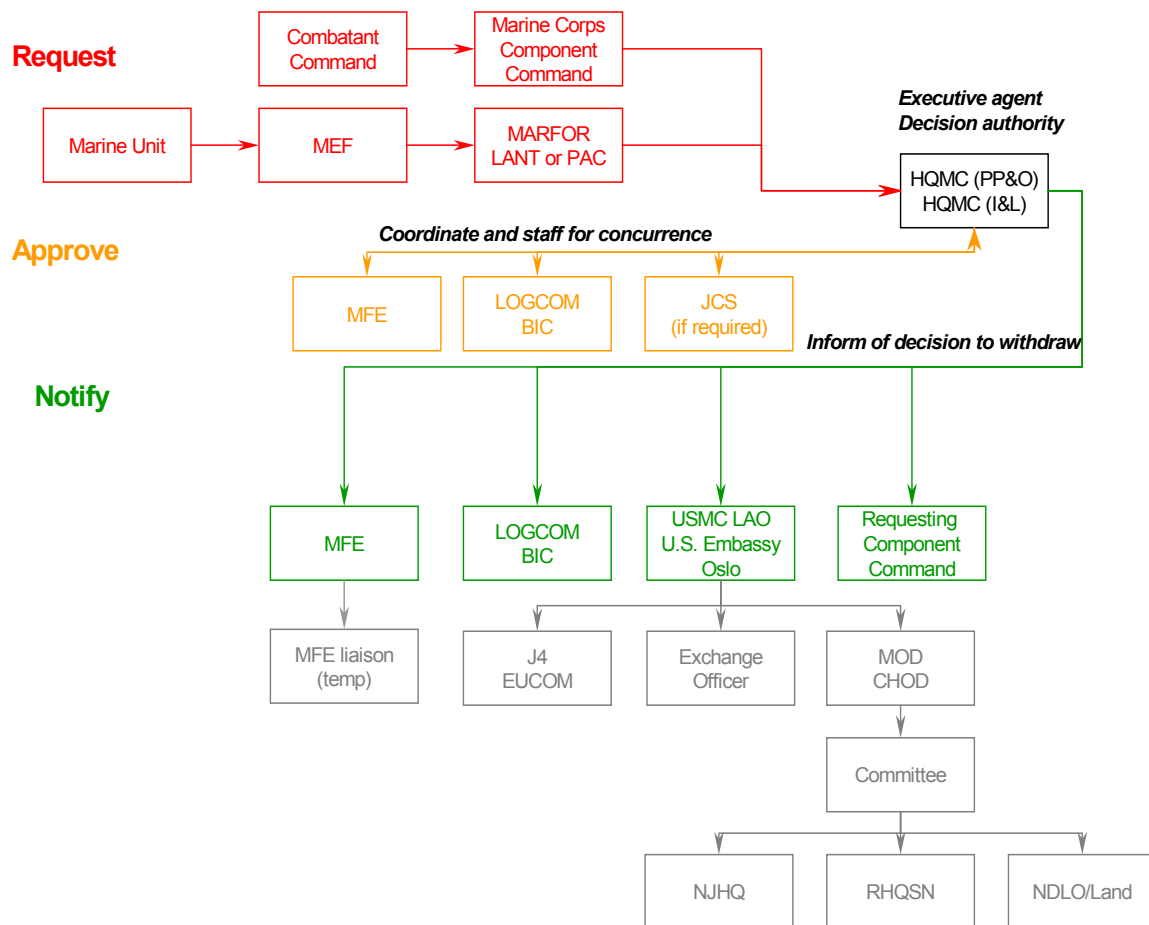
The withdrawal and embarkation of the equipment and supplies will likely present the most challenges. This portion of the mission is different from other Marine Corps operations, such as MPF. The process of rapid withdrawal, movement to the point of embarkation, and staging for strategic transport (by air, sea or rail) is unique to NALMEB. While this process may be relatively straightforward for a small MAGTF, it will be complex for larger forces. Once the equipment and supplies arrive in the area of interest, the process becomes somewhat similar to the usual MPF arrival and assembly operations.

Activation process

The current policy for out-of-Norway use of the NALMEB equipment and supplies is outlined in [41]. Previously, we identified several potential problems with the policy, including the designation of MFE as the executive agent for operations outside of Norway and the

overuse of the term “executive agent” in general [6]. The current policy also confuses the request, approve, and notification processes by trying to address them simultaneously. To clarify the current policy, we suggest a three-step activation process for NALMEB: request for use of NALMEB equipment and supplies, approval of the request for use, and notification of approval. Our proposed activation process is shown in figure 8. We suggest that the Marine Corps use this process for both “out of area” and “out of AOR” missions.

Figure 8. Proposed activation process



The activation process centers around HQMC, which is the executive agent and, at the direction of the CMC, the decision authority for the program. The request portion of the process is focused on U.S.-initiated withdrawals only. If the requesting unit is under the direction of a combatant commander, the request is passed to HQMC (PP&O) and HQMC (I&L) through the Marine component command [42].⁴ Otherwise, the request can pass through the normal chain of command. Our request process assumes that other services will request use of NALMEB equipment and supplies only through the combatant command.

We propose that before deciding to use NALMEB, HQMC coordinate and staff the request with several other commands and staffs including MFE; LOGCOM, BIC; and the Joint Chiefs of Staff (JCS) if required. MFE is the Marine component command to EUCOM, and movement of military equipment within or out of this AOR should be coordinated with EUCOM. LOGCOM, BIC, working with the MEB section in Norway, manages the NALMEB inventory. If the request is from a combatant command, staffing with the JCS may also be required. This appears to be the approval process used today.

Once HQMC decides to use the equipment and supplies, the relevant Marine and Norwegian commands must be notified. Figure 8 suggests that HQMC should pass the decision directly to them. Key to the notification process is ensuring that the Norwegian military is notified through the proper chain of command. In recent operations, lower elements of the Norwegian military have been informed of upcoming events at the action officer level. To prevent embarrassment, we suggest that HQMC inform the U.S. embassy in Oslo directly. The Marine officer at the U.S. embassy will then inform the Norwegian military chain of command as well as the exchange officers.

4. We were unable to determine the division of NALMEB roles and responsibilities between PP&O and I&L. While PP&O is named the executive agent for the program, at times, I&L takes on many of these responsibilities. We recommend PP&O and I&L clarify their roles.

During the notification process, HQMC may want to assign coordinating authority for withdrawal operations to MFE. Coordinating authority is different from executive agent responsibilities. We will discuss it in the next section.

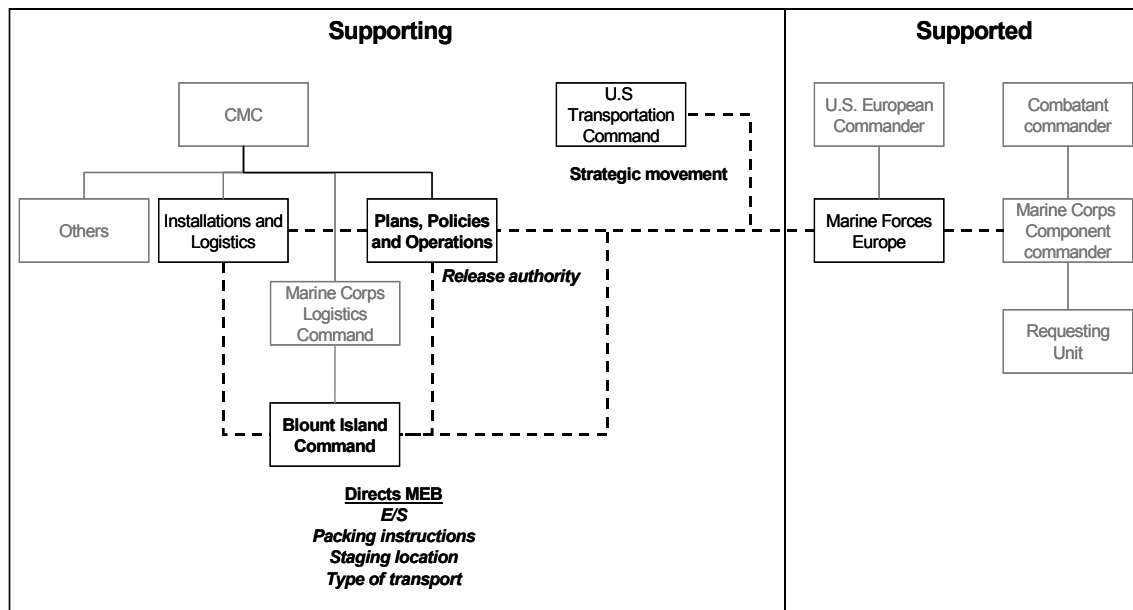
Withdrawal operations

The next step in the NALMEB activation process is the withdrawal of equipment. While extensive coordination is required, the actual withdrawal is executed by the Norwegian MEB section at the direction of BIC. In this section, we take a closer look at the Marine Corps and Norwegian command and control for withdrawal operations. Some elements of the command relationships are still emerging as the program becomes more expeditionary and Norway's armed forces reorganize.

The Marine Corps command and control for withdrawal operations is shown in figure 9. The dark lines indicate the principal organizations involved. The release authority comes from the CMC through HQMC (PP&O). After notification, HQMC (PP&O) takes a supporting role in the remainder of the withdrawal operation. MFE begins coordinating with the U.S. Transportation Command (TRANSCOM) for strategic movement, while the Blount Island Command (BIC) drafts a message outlining the equipment/supplies to be withdrawn, packaging instructions, staging location, and type of transportation needed. This message is chopped through HQMC I&L and PP&O before being released to the Norwegian MEB section.

To facilitate withdrawal operations, HQMC (PP&O) should consider designating MFE the coordinating authority for withdrawal operations instead of the executive agent for out-of-Norway operations (as described in [41]). The term "executive agent" is used to delegate authority through some type of designating document. Joint doctrine describes "executive agent" as "a term used to indicate a delegation of authority by the Secretary of Defense to a subordinate to act on the Secretary's behalf" [42]. Neither of these definitions describes the role played by MFE in withdrawal operations.

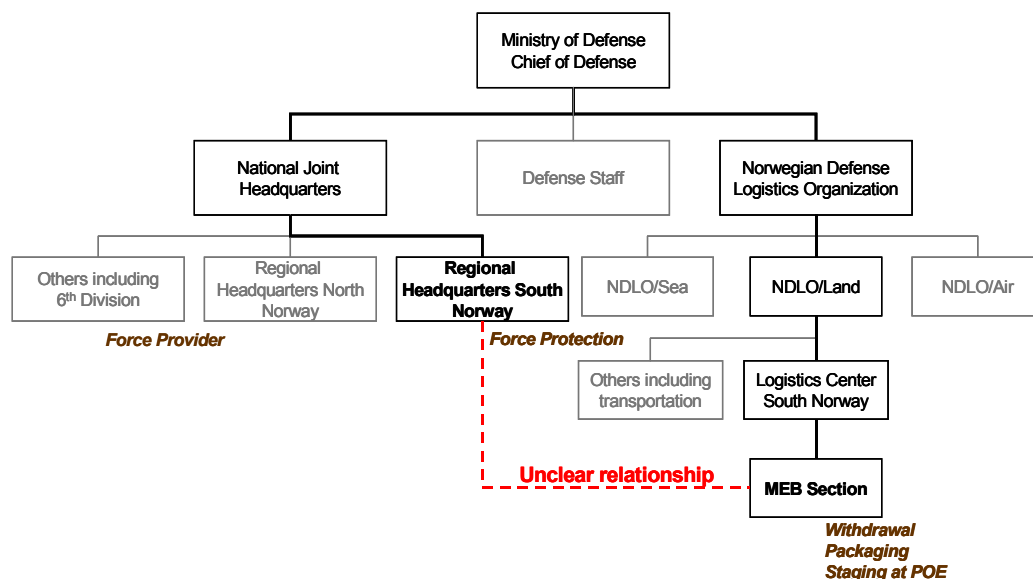
Figure 9. Marine Corps C2 for ground equipment/supplies withdrawal operations



As the Marine component in the AOR where NALMEB is located, MFE is a reasonable choice for coordinating authority. Joint doctrine describes coordinating authority as the “responsibility for coordinating specific functions or activities involving two or more military departments, joint force components or forces from the same service [42].” This is a good description of MFE’s role in the withdrawal process. MFE is coordinating with TRANSCOM, HQMC, LOGCOM, and the requesting unit for each withdrawal operation.

The Norwegian command and control for withdrawal operations is shown in figure 10. The dark lines show the principal commands involved. BIC directs the MEB section to withdraw equipment and supplies. The MEB section reports to NDLO/Land through the Logistics Center South Norway. Previously, the MEB section reported to the Commander, Joint Regional Headquarters South Norway (RHQSN), who is also the base commander for the MEB section. The reorganization has led to some tensions between these commands as well as between the higher headquarters, NDLO and NJHQ.

Figure 10. Norway C2 for ground equipment/supplies withdrawal operations



Before the reorganization, JRHQSN was Defense Command Trondelag (DKT), the command in charge of all aspects of NALMEB operations, including force protection and the MEB section. As JRHQSN, the commander no longer controls the resources to provide force protection or the MEB section. The reorganization changed the reporting lines, but did not change the location of the commands or personnel.

The relationship between JRHQSN and the MEB section will be resolved by the Ministry of Defense/Chief of Defense. The three proposals outlined below have been suggested, and resolution is expected soon.

- JRHQSN proposal
 - JRHQSN has daily coordinating authority.
 - JRHQSN has tactical control during withdrawals.
- NDLO/Land proposal
 - Chain of command is used for daily operations.
 - JRHQSN has coordinating authority during withdrawals.

- Chief of Defense proposal
 - Chain of command is used for daily operations.
 - JRHQSN has operational control during withdrawals.

While this reorganization is a point of tension in the Norwegian military, it has not affected withdrawal operations and should not concern the Marine Corps.

Implementation

The Marine Corps wants an expeditionary NALMEB. In this study, we have determined the feasibility of change, derived new missions, examined equipment mix implications, looked at costs, and addressed some issues related to potential changes in the program. This section combines our findings and looks at the major program elements that must be addressed in order to implement and institutionalize the new NALMEB.

This section looks at what needs to be done to evolve NALMEB. The four necessary actions—change policy, update the prepositioning objective, refine the concept, and begin training—can be implemented concurrently; yet, there are sequential steps within each action. Our intent is to provide an overall approach to implementation, with the understanding that the Marine Corps will fill in the details once the senior leadership has decided NALMEB’s future.

Change policy

Changing the policy governing the NALMEB program is a process that must begin with changes to the MOU. Reference [8] showed that at least two types of changes to the MOU are politically feasible. The MOU can be modified:

- To allow missions outside of Norway, and
- To change the equipment mix, so that it better supports such missions.

HQMC now has the opportunity to initiate such changes. Doing so would involve three steps. First, the Marine Corps would need to decide what language it would like to have in the relevant paragraphs of the MOU. Then the Marine Corps would initiate the formal process to change the MOU. This would involve working with other organizations, primarily the OSD, which is the signatory agency for the MOU.

Once this had been done, the MOU's supporting documents would need to be changed in order to be consistent with the changed MOU. These steps are fairly straightforward, and the following paragraphs present an outline of how they could be pursued.

Step One. The language concerning the NALMEB's mission is found in the MOU's preamble and paragraph one. One option for modifying this language was discussed earlier in this report. Any new wording would likely state that the original mission still continues but that others outside Norway may also be undertaken with NALMEB equipment.

The language concerning the equipment mix is found in paragraphs two and three of the MOU, which list the approximate numbers of trucks, howitzers, and other items included in the prepositioned equipment set. Before proposing changes to this language, HQMC must determine, at least generally, what mix of equipment it wishes to store in the caves in the future. Options for changing the equipment set are discussed elsewhere in this paper, and updating the prepositioning objective is discussed below.

Step Two. After developing the proposed changes to the MOU's language, HQMC would present them to OSD. Because the MOU is an agreement between the Ministry of Defense (MOD)—Department of Defense (DOD) (vice government to government), a U.S. initiative to modify its language could be worked largely within the DOD. The steps involved are explained below.

The first step is for HQMC, at the working level, to present and explain its draft revisions of the MOU to working-level counterparts in the OSD. The appropriate office is the Nordic/Baltic Desk of the Deputy Assistant Secretary of Defense (DASD) for NATO and Europe. The DASD for NATO and Europe is subordinate to the Assistant Secretary of Defense for International Security Policy, one of several assistant secretaries subordinate to the Under Secretary of Defense for Policy.

Once OSD understood and supported the new MOU language, it would likely be discussed with more senior members of the OSD hierarchy, up to the Under Secretary for Policy. Explanations should

include aspects of the new language (if any) that are expected to be difficult to negotiate. Given our findings in [8], we do not expect any of the issues raised to be especially contentious.

Next, OSD and the assigned action officers from HQMC would present the new draft MOU to Norwegians at the working level. This contact could be made through the Defense Attache Office (DAO) in Oslo. The Norwegian side would then have the opportunity to comment informally, at the action officer level, or propose alternative language.

Assuming that the outcome of these discussions was not contentious, the U.S. side would then share the new draft with the State Department (although the embassy in Oslo would already have been notified, when the DAO first brought the draft to the Norwegian side), as well as the General Counsel of OSD. Assuming there were no objections from either of these, the U.S. side could proceed to finalize the draft language and present it formally to Norway. Since the MOU is a MOD-DOD agreement, it is not certain that the Norwegian government would have to present the new language to the Storting (the Norwegian parliament), but it might do so anyway—perhaps to one of the Storting's committees on foreign and defense policy.

Step Three. Once the MOU has been formally changed, the supporting policy documents, including, at a minimum, the Prepositioning Objective, Terms of Reference, Prepositioning Arrangement, and Technical Manual, would be changed to accurately reflect the new language of the MOU [15, 40, 43, 44]. The Prepositioning Arrangement was updated fairly recently (2000) to reflect operations outside of Norway, and both the Technical Manual and Terms of Reference are currently in the revision process. We discuss the Prepositioning Objective next.

Update the Prepositioning Objective

The current Prepositioning Objective is based on the defense of Norway mission [15]. As NALMEB becomes expeditionary, updating both the Prepositioning Objective and the tailoring process will be required. Currently, the Prepositioning Objective is determined by

considering the mission, plan, forces, and equipment. An expeditionary NALMEB that can support either one MEB or multiple smaller MAGTFs will have a considerably different mission, plan, and force list from that described in [15]. Below is our suggested order of events for updating the Prepositioning Objective:

1. Reach consensus on a NALMEB mission set. (HQMC (PP&O) lead)
2. Develop generic plan(s) to execute the mission set. The plans should be capabilities based and accommodate different sized MAGTFs, and different locations, response times, and modes of transportation. (Joint development between Marine Forces Europe, Marine Forces Central Command, and MEFs)
3. Update the tailoring objective with new assumptions that consider the amount of fly-in echelon equipment required and MAGTF size. (HQMC (I&L) lead)
4. Develop a new force list that describes small, medium, and large notional MAGTFs in support of the generic plan(s). The new force list should not be limited to a single MEF, but should acknowledge that the MAGTF can be sourced from any location. (MCCDC lead, but will need HQMC support)
5. Update the tailoring conference membership to include, at a minimum, HQMC, MFE, Marine Corps Combat Development Command, Marine Corps Systems Command, BIC, operating forces representatives, NDLO/Land, and NJHQ. (HQMC (I&L) lead)
6. Identify the total equipment requirement for the mission set, scaled for a small, medium, or large MAGTF operation. Adjust the total requirement with the assumptions developed in step 3 to give the new prepositioning objective. (HQMC (I&L) lead with membership listed in step 2)
7. Source the new prepositioning objective and develop an equipment transportation plan. (HQMC (I&L) and BIC co-lead)

Refine the concept

As the Marine Corps moves toward an expeditionary NALMEB, the derived missions and concepts of operations must be refined. While we suggested some missions that may be appropriate for NALMEB, the underlying assumptions and decision logic should undergo testing, evaluation, and refinement. In this section, we suggest that the Marine Corps use a combination of gaming, analysis, modeling, and experimentation to further develop the concept. Gaming and analysis can take place simultaneously, and it may be better to build the modeling and experimentation requirements afterward, using the gaming and analytical results.

Through gaming

In gaming, the focus is on understanding why decisions are made under different sets of circumstances. Effective games transport players to a game world, where they are decision-makers and the decisions have consequences. As the players work through the scenario and respond to the consequences of their decisions, critical elements emerge. These critical elements can then be explored with other tools, such as analysis, modeling, and experimentation [45].

With a realistic mission and scenario, gaming provides a good method to test and refine the NALMEB decision logic (figure 3). While still early in the development process, MFE is pursuing a NALMEB game with the Marine Corps Warfighting Lab (MCWL). Key to the success of the game will be developing clear expectations about what a game can (and cannot) accomplish. A game to justify NALMEB is probably not as beneficial as a game focused on processes, procedures, decision logic, and capability shortfalls.

Through analysis

Analysis is used to understand complex problems. Effective analysis breaks problems down into simple parts for individual study. Using critical thought processes, the analyst can add parts, discard them, or rearrange them in unique ways, offering a different perspective on the problem.

As NALMEB becomes more expeditionary, a variety of areas require analysis. For example, further analysis of how Marines, other services, and coalition forces integrate with NALMEB is important. While we touched on MPF and MEU(SOC) operations, a variety of options are available and more detail is required to generate feasible concepts of operations. Another example is analysis of the transportation options for out-of-Norway operations. Again, we touched on maritime transits, and ignored both rail and air transportation. All three areas must be further analyzed before each one's costs, benefits, and limitations can be understood.

Our analysis focused on the ground equipment aspects of NALMEB. The aviation and aviation support equipment are owned and managed differently, suggesting an analysis of the aviation-specific aspects of the program is necessary.

Another area for future analysis could focus on the implications of changing the equipment mix. We looked at how the equipment mix may change with a new mission, but did not look at how the program would need to change in order to support the new and/or different equipment. Once the new mission and equipment mix are determined, it will be necessary to analyze the likely changes in the budget, manpower, and burden sharing aspects of the program.

Through modeling and experimentation

Modeling is used to reproduce complex situations, and experimentation is used to test and measure ideas. Effective modeling can provide insights into situations highlighting both the strengths and weaknesses of a process. Effective experimentation offers a (relatively) controlled method of testing a new idea and measuring the results.

Both modeling and experimentation should be used to develop the processes and procedures for operations external to Norway. For example, modeling the process in figure 7 should provide insights into the constraints on the system. Experimentation with withdrawal, staging, and loading methods can reduce the process time while highlighting infrastructure and other capability shortfalls.

Begin training

The new NALMEB mission(s) should be exercised in order to practice/refine procedures and develop interoperability. Two events historically allow for NALMEB play, and both seem to be open to new concepts of operations. These two exercises are Battle Griffin, a triennial, bilateral exercise between the U.S. and Norway; and Strong Resolve, a quadrennial NATO exercise alternating between the northern and southern regions.

Battle Griffin was originally designed to test all aspects of NALMEB (deployment of forces from CONUS, withdrawal of equipment and supplies, redeployment within Norway, and integration of U.S. and Norwegian forces). We suggest that the intent of Battle Griffin remain the same—to test all aspects of NALMEB operations. Now, NALMEB operations are expeditionary, so Battle Griffin should focus on deployment of forces from CONUS (*including I MEF as well as II MEF*), withdrawal of equipment, *redployment outside of Norway*, and integration of U.S. and other forces, as appropriate. With the initial planning for Battle Griffin 2005 just beginning, this is an excellent opportunity to test some aspects of the expeditionary NALMEB.⁵

Strong Resolve is intended to demonstrate NATO's ability to deal with two simultaneous crises, including an Article 5 event. Participation in Strong Resolve (last held in 2002) has been scaled back in recent years. Discussions with planners at Joint Headquarters North, a sub-regional Allied Forces North NATO command, suggest that the NATO exercise program is undergoing major revisions [46]. In particular, NATO wants to make its exercises more relevant to today's strategic environment of asymmetric and terrorist threats. This could potentially offer the Marine Corps an opportunity to inject new types of events in the next Strong Resolve-type exercise (scheduled for 2006) that support expeditionary NALMEB operations.

In addition to Battle Griffin and Strong Resolve, the Marine Corps should consider developing exercises to practice integrating

5. MFE and NJHQ have started planning for Battle Griffin 2005, and intend to take a more expeditionary focus.

NALMEB with other capabilities. Several such exercises are worth pursuing. One could focus on integrating a NALMEB-sourced MAGTF with a MEU(SOC) to produce a large SPMAGTF. Another exercise could focus on integrating the extensive combat service support of NALMEB with the combat capability of a MPF MEB. A final exercise could focus on the engineering aspects of a major humanitarian assistance or reconstruction effort, and look at integrating Seabee and NALMEB operations.

Recommendations

Our study began when the DC, PP&O HQMC asked CNA to consider how the current strategic environment may affect the future of the NALMEB program. It is clear that a complete realignment of the NALMEB program is required. Our study focused on the elements of such a realignment, including bilateral constraints, missions, equipment mix, cost, policy, program management, and implementation. For quick reference, this section summarizes the major recommendations of the study:

- ***Change the NALMEB mission.*** The mission of NALMEB is the defense of Norway, a Cold War mission. A new mission is needed. At a minimum, the new mission should focus the program on operations outside of Norway. NALMEB can support many types of missions, depending on the intent of the Marine Corps. Details on potential future missions can be found in [7].
- ***Update the bilateral MOU.*** The MOU is the guiding program document that sets out the NALMEB mission and general equipment set. To change the program, the MOU must be updated to reflect the new mission(s). The implementation process is discussed in the previous section, and the bilateral support for such changes is discussed in [8].
- ***Update the prepositioning objective.*** A new NALMEB mission will require a close look at the current prepositioned equipment mix. Our analysis shows some equipment shortfalls for low- to mid-intensity conflicts that should be considered [8].
- ***Update the tailoring process.*** The prepositioning objective is determined by using the tailoring process outlined in [15]. The process needs several revisions to account for changes in the Norwegian military and the concept of operations, as discussed in the previous section.

- ***Clarify the use of NALMEB policy.*** The policy should clearly describe the different steps of the NALMEB activation process, calling out roles and responsibilities, as appropriate. The use of the term “executive agent” should be limited to HQMC (PP&O), in order to help with clarification. We offer suggestions on the structuring of the activation policy in previous sections.
- ***Begin training for the new mission(s).*** A NALMEB focused on operations outside of Norway could involve forces from across the Marine Corps. Through either new or redesigned exercises, the Marine Corps should consider training opportunities for all MEFs as well as exercising the out-of-Norway operations process (figure 6).
- ***Develop methods to integrate NALMEB with a deployed MEU(SOC) or MPF.*** NALMEB is currently a stand-alone program in many respects. Linking NALMEB with other Marine Corps prepositioning/forward-deployed programs increases the capabilities of all the programs without buying new equipment or supplies. Such an approach could increase the Marine Corps’ responsiveness and global presence with the current programs and systems (details in previous sections).
- ***Develop methods to integrate NALMEB with joint or coalition forces.*** Adjusting the NALMEB mission and equipment mix offers the Marine Corps a unique opportunity to develop a capability that complements other forces. As an example, we looked at the Norwegian FIST-H program, but other joint and coalition opportunities should be explored. In particular, NALMEB could be considered as a U.S. contribution to the NATO Reaction Force.

The NALMEB program offers an opportunity for the Marine Corps to restructure a program for the post-September 11th world while continuing the tradition of strong bilateral ties between Norway and the U.S. A restructured NALMEB program could better support the 1:4:2:1 construct, and has a place in the future Marine Corps prepositioning program[47].

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